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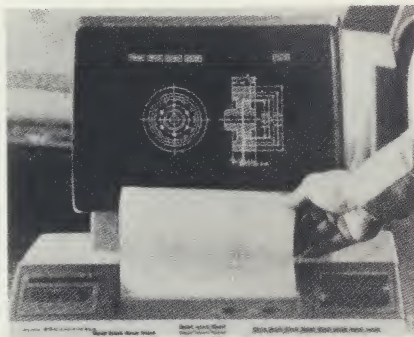
DM

DATA MANAGEMENT

**Computer graphics:
Capabilities go up,
price tags go down**

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SECT

Computer aided drafting comes to small companies



QUICK CHECK PRINTS are provided by an integral thermal printer on the AM Bruning EasyDraf² computer. It also features an interactive keyboard, CRT, and a cassette tape drive for automatic program start-up.

Drawing pictures is no finger-painting exercise for architects and engineers.

It demands precision, imagination, skill and a hell of a lot of patience.



AM BRUNING'S EASYDRAF² Computer Aided Drafting System offers significant productivity increases over manual drafting methods. Within three months, drafters can increase productivity from three to 20 times, depending upon the project involved.

Ask a drafter what piece of equipment is used most and he or she will say that it's an eraser!

But erasing one line usually means erasing a hundred or more lines within a part or a floor layout. Patience!

Now engineers and architects, who have run out of patience, can run out and buy a low cost computer aided drafting (CAD) system. That's good for the large firms that can afford a quarter of a million dollar system. But what happens to small departments or small businesses?

What happens is a desktop computer and its wonderful characteristic—it's cheap. For example, marketing a standalone computer aiding drafting system priced under \$100,000, AM Bruning has decided

to penetrate the largest and fastest growing segment of the CAD industry, according to John Schwan, vice president marketing for AM Bruning.

Market predictions

Industry analysts vary in their predictions for the overall CAD market, indicating compound growth rates ranging from 30 to 50 percent annually for the next several years. Sales should reach \$1.5 billion in 1984. Bruning's EasyDraf² was designed by drafters and engineers specially for drafters. "Until now, the power of computer aided systems has not been widely available to the vast drafting marketplace because of the high cost and complexity of existing systems, which carry price tags as high as \$300,000 and more," Dieter Tannenbergh, president of AM Bruning, tells DATA MANAGEMENT. Depending on the application, Tannenbergh explains, a drafter experienced on the Bruning EasyDraf² would increase productivity by a factor of three to 20—not bad for a \$70,000 price tag.

System components

The processing unit of this CAD system is a desktop computer manufactured by Hewlett Packard: The model 9845T designed primarily for engineers and scientists. The computer contains 318k bytes of memory, interactive keyboard and mono-

*For a \$70,000 price
drafting productivity is
expected to increase by
a factor of three to 20.*

chromatic CRT display. A tape cartridge drive provides automatic program set-up when the unit is turned on, and a built-in thermal line printer prepares check prints in a matter of seconds. Two online flexible disk drives provide mass storage capabilities. Higher capacity Winchester hard disk drives also are available as an option.

The companion graphics tablet—a computerized version of the drafting table—serves as the chief instrument for entering drawing informa-

Educational institutions gearing up to teach future drafters, architects, about computer aided drafting

The advent of inexpensive computer aided drafting (CAD) systems, combined with an expected upsurge in construction during the early 1980s, is producing a ripple effect of change in architectural offices and on college campuses. That opinion, shared by leading architectural educators, points to a revolution now beginning in the field.

"I would guess that within five years, and given proper funding, we will be spending at least one semester and maybe more working with architectural students on Computer Aided Drafting," Dean John Bryant of the Oklahoma State University School of Architecture, tells DATA MANAGEMENT. "It's going to change our whole approach toward educating architects."

Students like it

Professor Tony White of the University of Florida School of Architecture agrees. "It's very exciting to students," he says. "Even people who are reluctant to use computers lose their inhibitions very quickly."

Both OSU and UF have installed CAD systems. Each currently has a single workstation, with students vying to schedule time.

Systems that take the drudgery out of drafting will dominate the architectural field in the next decade, according to White, providing they are affordable for average-sized offices. "The single workstation system can be effectively and economically used in architectural offices with as few as six or eight people," he comments.

Such low-end systems provide all of the computer power needed for

drafting. But they avoid the expensive software and memory capacities of more complex Computer Aided Design systems.

"I don't think the architectural community sees much need for computer aided design," White says. "They'll opt for the drafting much more quickly. Unless you're talking about a very complicated building, you can do the design faster the old way. By the time you get all the variables programmed into the design system you've lost a lot of time."

A personal process

The design process itself tends to be highly personal and even secretive, Dean Bryant believes. That leads architects to prefer their own sketching over the more impersonal computer. "Freehand sketching is a quicker way to get ideas out of the mind and onto paper," he says. Once the creative function is completed, the mechanical drafting function can be readily and efficiently adapted to a computer system.

In addition, drafting is more closely related to communicating than to creating. A skilled drafter is communicating ideas between the architect-designer and the builder or fabricator in the field. A low-end computer aided drafting system can significantly improve that process.

"I don't know many architects who like to draft," White observes. "In smaller firms, where architects have to do both jobs, these kinds of systems will be very useful."

Among the keys to drafting efficiency found with computer sys-

tems is the ability to make rapid changes, the educators said. A change on one floor of a multifloor building, for instance, could require similar changes on every floor.

Rapid changes are possible

"There's no more need to take your electric eraser and wipe out half of a building," White says. "With computer aided drafting, it makes everything automatic once you've made the first input."

Students learn to use the computerized systems faster than expected. At OSU, Dean Bryant estimates "after 15 hours of familiarization, anybody ought to be able to use the system" and that true skill follows with practice.

The availability of relatively inexpensive CAD systems will have a significant impact on both architectural teaching and practice. At the University of Florida, computers are routinely used. "For the moment, we have basically an exposure situation rather than a sweeping change in curricula," White comments. "But if the funds were available, we'd go into CAD very quickly."

In Oklahoma, several architectural firms already are fully computerized and Bryant looks forward to the day when students spend more time at a computerized work station than at a drafting table. "One good drafter can do the work of three with a computer system," he said.

When you think about the effort involved in just laying out electrical systems, plumbing, and other machinery-related items in a plan, anybody doing that by hand these days is missing something. ■

tion. Drafters manipulate a movable cursor on the CRT screen by sliding a corresponding hand-held "puck" across the graphics tablet. Four buttons on the tablet puck provide a minikeyboard for entering most drafting commands.

Interactive questions and answers between computer and drafters provide a means of entering drawing information into the system.

The final system component, the AM Bruning drafting plotter, prepares high quality, multicolor engineering and architectural drawings on all standard drafting materials.

At 60cm per second maximum velocity with 4Gs acceleration, the plotter is the fastest available in the low-cost segment, according to the manufacturer. The unit produces even complex drawings in minutes.

The plotter uses as many as eight different colored pens—roller ball, fiber tip or liquid ink—and interchanges them according to programmed instructions, without operator intervention. It caps pens automatically when they are not in use.

Drafters can use the plotter offline to support production on several EasyDraf² systems. ■

AM Bruning announces EasyDraf²



-the affordable Computer-Aided Drafting System that can increase productivity 3 to 20 times!

It's for firms with as few as 3 drafters doing mechanical, schematic or architectural drafting.

Now you don't have to spend hundreds of thousands of dollars to switch from "old fashioned" drafting techniques to faster, more accurate, more cost-efficient computer-aided drafting.

Now there's EasyDraf².

It's easy to master.

EasyDraf² software was developed by designers for designers who do mechanical, schematic or architectural drafting. Anyone who does drafting can easily master the EasyDraf², because the techniques are virtually the same. Its hardware is manufactured to Bruning's specifications by Hewlett-Packard.

The result: a "turnkey" system that any designer, engineer, architect or drafter can master in just a few days...without having to learn computer technology!

And it fits in anywhere—in a space as small as 10 ft. x 10 ft.—with no special installation or environmental requirements.

It increases productivity up to 20X.

Once mastered, EasyDraf² can increase productivity three to 20 times. The more repetitive or exacting the task, the greater the productivity gain.

So your present staff will be able to do more in less time—reducing overtime. And projects will be completed sooner. Which can help increase profits and improve your competitive situation.

It increases accuracy, too.

EasyDraf² draws to exact dimensions (up to four decimal places), and calculates the exact dimensions

between any selected points on a projection—in any scale you select!

Also, it speeds and simplifies revision-making...relieves the boredom of repetitive tasks...and extends the creative abilities of your staff by permitting more "what if we tried this" approaches.

It does all this...and more.

EasyDraf² can: Draw construction, center, real or hidden lines at any spacing, at any angle, through any point, and at any specified distance from the X or Y axis... Draw arcs or circles of any radius, wherever wanted... Draw holes of any size... Delete any part of a line, arc or shape...without redrawing the picture... Enlarge or reduce, to any degree, any area of a picture...and Label a picture alphanumerically.

It can also: Do cross-hatching... Scale a picture—instantly... Save a picture, any part of it, or any shape or symbol, for re-use... Add pointers... Calculate the exact dimensions between any selected points... Rotate a picture to any orientation...and Create composites or revisions in seconds—while retaining the original(s).

And, it can deliver a quick, inexpensive check print electronically... or produce a drawing, to scale, on drafting media or bond paper—in sizes up to 24" x 46"—faster, better and more accurately than even the best drafter!

It's especially suited for mechanical, schematic or architectural drafting.

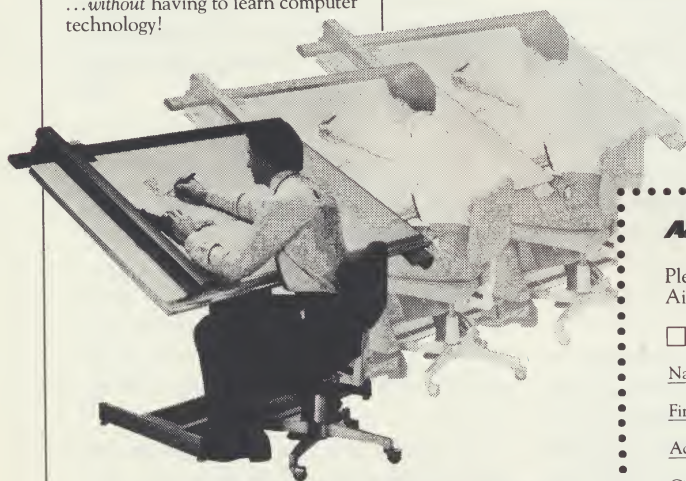
Because of its ability to store symbols and details—then re-use them in any size and location—EasyDraf² is ideal for mechanical, schematic or architectural applications.

Modifications are incredibly easy to make, as are composite drawings. As many as 11 overlays can be maintained in exact registration.

And, it's available now.

The EasyDraf² CAD system is available right now, from AM Bruning. Complete customer support—hardware servicing, software updates and a three-day training course—are available, too. Training in specialized applications also available.

So if your people are still drafting the "old fashioned" way, get all the details on EasyDraf², without obligation.



It makes every drafter 3X to 20X more productive!

AM Bruning

AM Bruning 1800 Bruning Drive West • Itasca, Illinois 60143

Please have an AM Bruning representative contact me about the new EasyDraf² Computer-Aided Drafting System. We are particularly interested in the following applications:

☐ Mechanical Engineering ☐ Schematic Drafting ☐ Architectural Drafting

Name Title

Firm

Address

City State Zip

Phone No. () Ext. No. of people doing drafting:

Area Code

AM and Bruning are registered trade marks, and EasyDraf² is a trademark of AM International Inc.